



DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2022-0150; Project Identifier MCAI-2021-00839-E; Amendment 39-22065; AD 2022-11-15]

RIN 2120-AA64

Airworthiness Directives; Rolls-Royce Deutschland Ltd & Co KG (Type Certificate previously held by Rolls-Royce plc) Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is adopting a new airworthiness directive (AD) for all Rolls-Royce Deutschland Ltd & Co KG (RRD) Trent 7000-72 and Trent 7000-72C model turbofan engines. This AD was prompted by in-service experience showing that certain high-pressure turbine (HPT) blades may prematurely deteriorate to an unacceptable condition when managed in accordance with the inspection intervals in the Time Limits Manual (TLM). This AD requires initial and repetitive on-wing borescope inspections (BSIs) of the HPT blades to detect axial cracking and, depending on the results of the inspections, replacement of the HPT blade set, as specified in a European Union Aviation Safety Agency (EASA) AD, which is incorporated by reference (IBR). The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the IBR of a certain publication listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: For material incorporated by reference in this AD, contact EASA, Konrad-Adenauer-Ufer 3, 50668 Cologne, Germany; phone: +49 221 8999 000; email: ADs@easa.europa.eu. You may find this material on the EASA website at <https://ad.easa.europa.eu>. You may view this material at the FAA, Airworthiness

Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110. It is also available at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2022-0150. For Rolls-Royce service information identified in this AD, contact Rolls-Royce plc, Corporate Communications, P.O. Box 31, Derby, DE24 8BJ, United Kingdom; phone: +44 (0)1332 242424; fax: +44 (0)1332 249936; website: <https://www.rolls-royce.com/contact-us.aspx>.

Examining the AD Docket

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2022-0150; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, the EASA AD, any comments received, and other information. The address for Docket Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W121-40, 1200 New Jersey Avenue SE, Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Nicholas Paine, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7116; email: nicholas.j.paine@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

EASA, which is the Technical Agent for the Member States of the European Union, has issued EASA AD 2021-0169, dated July 19, 2021 (EASA AD 2021-0169), to address an unsafe condition for all RRD Trent 7000-72 and Trent 7000-72C model turbofan engines.

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to RRD Trent 7000-72 and Trent 7000-72C model turbofan engines. The NPRM published in the *Federal Register* on March 1, 2022 (87 FR 11355). The NPRM was prompted by in-service experience showing that certain HPT blades may prematurely deteriorate to an unacceptable condition when managed in accordance with the inspection intervals in the TLM. The manufacturer published Rolls-

Royce (RR) Alert Non-Modification Service Bulletin (NMSB) Trent 1000 72-AK449, Revision 2, dated July 5, 2021 (the Alert NMSB) specifying procedures for performing initial and repetitive on-wing BSIs of the HPT blades to detect axial cracking. The Alert NMSB also specifies procedures for removing the engine from service to replace the HPT blade set before exceeding a specified number of flight cycles. The compliance time for the initial and repetitive BSIs of the HPT blades required by this AD meet the TLM inspection intervals for HPT blade, part number KH64485. In the NPRM, the FAA proposed to require accomplishing the actions specified in EASA AD 2021-0169, described previously, as incorporated by reference, except for any differences identified as exceptions in the regulatory text of this AD. The FAA is issuing this AD to address the unsafe condition on these products. See EASA AD 2021-0169 for additional background information.

Discussion of Final Airworthiness Directive

Comments

The FAA received comments from three commenters. The commenters were Air Line Pilots Association, International (ALPA), Delta Air Lines, Inc. (DAL), and an individual commenter. The following presents the comments received on the NPRM and the FAA's response to each comment.

Request to Add AD Reference to Paragraph (b)

DAL requested that the FAA add a reference to AD 2021-25-03, Amendment 39-21846 (86 FR 71135, December 15, 2021), (AD 2021-25-03), to paragraph (b), Affected ADs. DAL commented that AD 2021-25-03 requires the operator's maintenance program be updated to incorporate Revision 7 of the RR TLM. DAL noted that Revision 7 of the RR TLM, Chapter 05-20, defines the interval for the piece-part inspection of the HPT blade. DAL also commented that Note 2 in paragraph (5) of EASA AD 2021-0169 specifically states that the life limitation cancelled the inspection intervals currently defined in the TLM. DAL stated that this AD would partially supersede the requirements of AD 2021-25-03.

The FAA disagrees with adding reference to AD 2021-25-03 in paragraph (b) of this AD. Paragraph (b) of this AD identifies superseded or revised ADs, or other ADs if

the requirements of those ADs are affected. The compliance times for the initial and repetitive on-wing BSIs of the HPT blades required by this AD are more restrictive than the inspection intervals specified in the TLM. This AD does not affect the requirements of AD 2021-25-03 and, as a result, AD 2021-25-03 is not an affected AD. The FAA did not change this AD as a result of this comment.

Request to Update Joint Aircraft Service Component (JASC) Code

DAL requested the FAA update paragraph (d), Subject, of this AD from JASC Code 7230 to JASC Code 7250. DAL commented that the required inspections and unsafe condition for the HPT fall under JASC Code 7250, not JASC Code 7230 as proposed in the NPRM.

The FAA agrees and has updated paragraph (d) of this AD.

Support for the AD

ALPA and an individual commenter supported the NPRM without change.

Conclusion

The FAA reviewed the relevant data, considered any comments received, and determined that air safety requires adopting this AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes, and any other changes described previously, this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

Related Service Information under 1 CFR Part 51

The FAA reviewed EASA AD 2021-0169. EASA AD 2021-0169 specifies instructions for performing initial and repetitive on-wing BSIs of the HPT blades to detect axial cracking and, depending on the results of the inspections, removal from service of the engine for in-shop replacement of the HPT blade set. EASA AD 2021-0169 also specifies instructions for replacing HPT blades with a new HPT blade set before exceeding a specified number of flight cycles.

This material is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

Other Related Service Information

The FAA reviewed RR Alert NMSB Trent 1000 72-AK449, Revision 2, dated July 5, 2021. This Alert NMSB describes procedures for performing initial and repetitive on-wing BSIs of the HPT blades to detect axial cracking. This Alert NMSB also specifies procedures for removing the engine to replace the HPT blade set before exceeding a specified number of flight cycles.

Interim Action

The FAA considers this AD to be an interim action. If final action is later identified, the FAA might consider additional rulemaking.

Costs of Compliance

The FAA estimates that this AD affects 16 engines installed on airplanes of U.S. registry.

The FAA estimates the following costs to comply with this AD:

Estimated costs

Action	Labor Cost	Parts Cost	Cost per product	Cost on U.S. operators
BSI HPT Blades	4 work-hours x \$85 per hour = \$340	\$0	\$340	\$5,440

The FAA estimates the following costs to do any necessary replacements that would be required based on the results of the inspection. The agency has no way of determining the number of aircraft that might need this replacement:

On-condition costs

Action	Labor Cost	Parts Cost	Cost per product
Replace HPT Blade Set	16 work-hours x \$85 per hour = \$1,360	\$2,001,780	\$2,003,140

The FAA has included all known costs in its cost estimate. According to the manufacturer, however, some of the costs of this AD may be covered under warranty, thereby reducing the cost impact on affected operators.

Authority for This Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this AD:

- (1) Is not a "significant regulatory action" under Executive Order 12866,
- (2) Will not affect intrastate aviation in Alaska, and
- (3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive:

2022-11-15 Rolls-Royce Deutschland Ltd & Co KG (Type Certificate previously held by Rolls-Royce plc): Amendment 39-22065; Docket No. FAA-2022-0150; Project Identifier MCAI-2021-00839-E.

(a) Effective Date

This airworthiness directive (AD) is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

None.

(c) Applicability

This AD applies to Rolls-Royce Deutschland Ltd & Co KG (Type Certificate previously held by Rolls-Royce plc) Trent 7000-72 and Trent 7000-72C model turbofan engines.

(d) Subject

Joint Aircraft Service Component (JASC) Code 7250, Turbine Section.

(e) Unsafe Condition

This AD was prompted by in-service experience showing that certain high-pressure turbine (HPT) blades may prematurely deteriorate to an unacceptable condition when managed in accordance with the inspection intervals defined in the Time Limits Manual. The FAA is issuing this AD to prevent failure of the HPT blades. The unsafe condition, if not addressed, could result in failure of the engine, in-flight shutdown, and loss of the airplane.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Required Actions

Except as specified in paragraph (h) of this AD: Perform all required actions within the compliance times specified in, and in accordance with, European Union Aviation Safety Agency AD 2021-0169, dated July 19, 2021 (EASA AD 2021-0169).

(h) Exceptions to EASA AD 2021-0169

(1) Where EASA AD 2021-0169 requires compliance from its effective date, this AD requires using the effective date of this AD.

(2) This AD does not require compliance with the “Remarks” section of EASA AD 2021-0169.

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the ECO Branch, send it to the attention of the person identified in paragraph (j) of this AD and email to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(j) Related Information

For more information about this AD, contact Nicholas Paine, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7116; email: nicholas.j.paine@faa.gov.

(k) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless this AD specifies otherwise.

(i) European Union Aviation Safety Agency (EASA) AD 2021-0169, dated July 19, 2021.

(ii) [Reserved]

(3) For more information about EASA AD 2021-0169, contact EASA, Konrad-Adenauer-Ufer 3, 50668 Cologne, Germany; phone: +49 221 8999 000; email:

ADs@easa.europa.eu. You may find this material on the EASA website at <https://ad.easa.europa.eu>.

(4) You may view this material at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110. This material may be found in the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2022-0150.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email: fr.inspection@nara.gov, or go to <https://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued on May 24, 2022.

Ross Landes, Deputy Director for Regulatory Operations,
Compliance & Airworthiness Division,
Aircraft Certification Service.

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